claim 20 and claim 38, respectively. Claim 59 is supported by Fig. 11. Each of the claims is fully supported by the specification.

The allowance of claim 45 and allowability of claims 30, 31 and 34-36 is noted with appreciation. Because claim 1 (on which claims 30, 31 and 34-36 depend) has been amended and is believed to be allowable, those claims are not being presented in independent form at the present time.

Claims 1-4, 6, 7, 10, 14-16, 20-27, 37-42 and 49 were rejected in the outstanding Office Action under 35 U.S.C. § 103(a) as unpatentable over U.S. Patent No. 5,783,888 (Yamano) in view of U.S. Patent No. 5,986,365 (Kuwert) and U.S. Patent No. 5,459,190 (Nakamura). This rejection is respectfully traversed in view of the foregoing amendment. Claims 1 and 14 have been amended to require an insert substantially encapsulated within the body. Page 16 of the specification defines the term "insert" to mean components other than the elements of the stator that are substantially encapsulated in the phase change material.

Yamano discloses a rotary electric machine. The patent is concerned with reducing the axial length of a motor where a fan is attached to the motor shaft. While the Abstract refers to molding a synthetic resin member 7 to the periphery of the stator, there is no disclosure of injection molding, as now required by claims 1 and 14. Furthermore, Yamano does not include an insert substantially encapsulated in a body of phase change material. Neither Kuwert nor Nakamura disclose an insert substantially encapsulated in a body of phase change material that substantially encapsulates the stator conductor. Thus claims 1 and 14, and claims 2-4, 6, 7, 10, 15-16, 21-27, 37-42 and 49 dependent thereon are patentable over the cited references, even if combined.

Claim 20 requires a body of phase change material that is injection molded and encapsulates at least a portion of the windings of the motor, and requires that the thermoplastic material includes aluminum oxide as a filler. None of the cited references disclose an injection molded thermoplastic material that contains aluminum oxide. Moreover, it would not have been obvious from the prior art to include aluminum oxide as a filler in a thermoplastic material designed for injection molding because aluminum oxide is an abrasive and wears away equipment traditionally used to manufacture thermoplastics and equipment traditionally used to injection mold parts from thermoplastics. Claim 20 is therefore patentable over the cited references.

New claim 55 also requires that the injection molded thermoplastic body substantially encapsulates stator conductors and an insert. Claim 55, like claims 1 and 14, is thus patentable over the cited references.

Claims 5, 8, 11-13, 17-19, 28, 32 and 46-48 were rejected in the outstanding Office Action under 35 U.S.C. §103(e) as being unpatentable over Yamano in view of Kuwert and Nakamura and further in view of U.S. Patent No. 5,942,824 (Shioya). This rejection is also respectfully traversed. The independent claims have already been shown to be patentable over the first three references above. The only new reference in this rejection is Shioya. Shioya discloses a motor and method of manufacturing the same. The Office Action takes the position that the embodiment of Fig. 7 of Shioya discloses a monolithically formed body 126, 124 substantially encapsulating the stator and substantially encapsulating an "insert 72". While Shioya does suggest that the base portion 122, pedestal portion 124 and holder portion 126 are integrally formed, there is no suggestion that the drive coils 70 are encapsulated in that piece. The drawings do not show any thermoplastic material substantially encapsulating the drive coils.

The Office Action refers to the yoke 72 as constituting the insert specified originally in claim 8, and now in claims 1 and 14. However, the yoke 72 is not substantially encapsulated either. In fact, column 15, line 6 states that a shallow groove 74 is formed in the base 61of Fig. 1, which groove is used to accommodate the yoke. Fig. 7 is identical to Fig. 1 in this regard. If the yoke were encapsulated by being injection molded into the base, there would be no groove formed first. Moreover, the materials used to make the yoke 72 (iron or steel, since it directs magnetic lines of force generated in the drive coils) and the base 122 (a nylon material with a ferritic magnetic material mixed in (Col. 18 lines 36-39)) are such that the yoke would not be encapsulated by being injection molded with the base. The materials have such different shrinkage rates that the base would crack if the yoke were already in place and the base molded around it. In addition, the nylon/ferritic material is used to form the stator-side thrust magnet portion 128 by direct polarization (Col. 18 line 44-46). It would not be desirable to try to magnetize this portion of the integral base, pedestal portion and holder portion while a steel or iron yoke was in place. Thus Shioya does not disclose injection molding a body that substantially encapsulates a stator and an insert

as required by claims 1 and 14. Claims 5, 11-13, 17-19, 28, 32 and 46-48 are dependent on claims 1 and 14 and are therefore also patentable over all the cited references, including Shioya, even if combined.

Claim 9 was rejected in the outstanding Office Action under 35 U.S.C. § 103(a) as being unpatentable over Yamano in view of Kuwert and Nakamura and further in view of U.S. Patent No. 6,043,583 (Kurosawa). This rejection is also respectfully traversed. Claim 9 is dependent on claim 1 and therefore patentable over the first three references for the reasons discussed above. Kurosawa does not disclose an injection molded thermoplastic body that substantially encapsulates stator conductors and an insert. Thus claim 9, like claim 1, is patentable over the cited references, including Kurosawa, even if combined.

Since each of the rejections has been overcome, the case is in condition for allowance. An early notice to that effect is respectfully requested.

Respectfully submitted,

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APPENDIX A

1. Changes to the paragraph on page 27, line 27, to page 28, line 9, are as follows:

(Thrice amended) One preferred thermoplastic material, Konduit OTF-212-11, which contains 55% aluminum oxide as a filler, was made into a thermoplastic body and tested for its coefficient of linear thermal expansion by a standard ASTM test method. It was found to have a CLTE in the range of –30 to 30°C of 1.09x10^{-5} in/in °F in the X direction and 1.26x10^{-5} in/in °F in both the Y and Z directions, and a CLTE in the range of 100 to 240°C of 1.28x10^{-5} in/in °F in the X direction and 3.16x10^{-5} in/in °F in both the Y and Z directions. (Hence, the relevant CLTEs for purposes of defining the invention are 1.09 x 10^{-5} in/in °F and 1.28 x 10^{-5} in/in °F.) Another similar material, Konduit PDX – 0-988, was found to have a CLTE in the range of –30 to 30°C of 1.1x10^{-5} in/in °F in the X direction and 1.46x10^{-5} in/in °F in both the Y and Z directions, and a CLTE in the range of 100 to 240°C of 1.16x10^{-5} in/in °F in the X direction and 3.4x10^{-5} in/in °F in both the Y and Z directions. By contrast, a PPS type polymer, (Fortron 4665) was likewise tested. While it had a low CLTE in the range of –30 to 30°C (1.05x10^{-5} in/in °F in the X direction and 1.33x10^{-5} in/in °F in both the Y and Z directions), it had a much higher CLTE in the range of 100 to 240°C (1.94x10^{-5} in/in °F in the X direction and 4.17x10^{-5} in/in °F in both the Y and Z directions).

2. Changes to the claims are as follows:

1. (Thrice amended) A motor comprising:

a) a shaft having a rotational axis;

b) a hub attached to the shaft and including a permanent magnet;

c) a bearing allowing rotation of the hub about the rotational axis of the shaft;

d) a stator comprising conductors; [and]

e) a monolithically formed body that substantially encapsulates the stator conductors, wherein a thermoplastic material is injection molded to form the body and the body is configured to align the shaft, hub and bearing with respect to the stator;

and mounting features are formed in the body to mount the motor to a device to be powered by the motor; and

f) an insert substantially encapsulated within the body.

14. (Thrice amended) A high speed spindle motor for a disc drive comprising:

a) a shaft;

b) a disc support member attached to the shaft;

c) a bearing disposed around the shaft;

d) a stator; [and]

e) a monolithically formed body that substantially encapsulates the stator, the monolithically formed body surrounding the bearings and the shaft, the body being formed by injection molding and being made of a material having a coefficient of linear thermal expansion of less than 2×10^{-5} in/in °F throughout the range of 0-250°F; and

f) an insert substantially encapsulated within the body.

18. (Amended) The high speed motor of claim 14 wherein the insert comprises an enhancement magnet [is substantially encapsulated within the body].

20. (Twice amended) A [high speed spindle] motor [for a disc drive] comprising:

a) a shaft;

b) [a disc support member attached to the shaft and including a permanent magnet;

c)] a bearing surrounding the shaft;

[d) a stator] c) windings acting as conductors; and

[e)] d) a monolithically formed body that substantially encapsulates at least a portion of the [stator] windings, wherein a thermoplastic material is injection molded to form the body, the material [has a coefficient of thermal conductivity of at least 0.7 watts/meter°K at 23°C and the body is configured to align the shaft, disc support member and bearing with respect to the stator] including aluminum oxide as a filler.

30. (Twice amended) The motor of claim [8] 1 wherein the insert provides structural rigidity to the body.

31. (Twice amended) The motor of claim [8] 1 wherein the insert enhances heat transfer away from the bearing and the stator.

34. (Twice amended) The motor of claim [8] 1 wherein the insert enhances dampening of motor vibration.

35. (Twice amended) The motor of claim [8] 1 wherein the insert enhances dampening of audible noise.

36. (Twice amended) The motor of claim [8] 1 wherein the shaft is fixed to the body and the insert is positioned between the shaft and the bearing.

46. (Amended) The motor of claim [8] 1 wherein the insert is rigidly fixed to the stator by the body and is connected to the stator only through the thermoplastic material.